APPENDIX 18: EXPLANATION OF ECONOMIC ANALYSIS METHODOLOGY

This appendix briefly explains the methodology used in Chapter 4 for calculating the impact of AUM reductions on income and employment.

A review of the literature and discussion with both BLM and Forest Service agricultural economists was conducted to identify the best possible methodology for estimating the income and employment impacts of grazing reductions on BLM land. Because a livestock operator has a number of options in response to permit AUM reductions, an analysis of all possibilities would be very lengthy and inappropriate for the present analysis. For the present assessment, only the decision to reduce herd size to match allowable AUMs is analyzed. This is a reasonable choice given the present high cost of supplemental feed and the low prices for cattle. After it was discovered that almost all of the projected AUM impacts would occur in two counties, the impacts for the balance of the EIS study area were based on simple extrapolations of the principal county impact factors to the numbers for the other counties. The result is a better estimate than could be obtained through a large area impact formula.

The principal county analysis focused on specific AUM reductions for specific permits. This is the most accurate approach available because herd size changes (and sales income lost) are directly related to AUM reductions for a particular livestock operation. Based on discussion with county farm advisors and BLM range conservationists, a 5.5 month season of use assumption is used for herd size calculations. The impact of AUM reductions on herd size uses the Constant Elasticity of Substitution (CES) model developed by researchers at the Economic Research Service of the U.S. Department of Agriculture. It is presented in the Rangeland Reform EIS, Appendix G, "Economic Aspects of Supply and Demand for Livestock Forage on Public Lands (BLM 1994). The CES model used data in the 1990 USDA Farm Costs and Returns Survey of western livestock operations to model the tradeoffs between federal grazing and other forage sources. The model permits a calculation of percent herd size reduction from percent permit AUM reduction. In effect, this is a worst case scenario. If the operator has access to surplus pasture or inexpensive supplemental forage the herd size reduction could be less.

The income impact analysis is based on an average sale per cow-unit calculation developed by Rick Delmas of the Modoc County Farm Advisor Office. The calculation uses a 300 head cow-calf operation with 85 % calf crop, 2 % cow mortality, 20 % replacement and the following cattle prices: 450 # steers @ $74/100#, 425 # heifers @ $68/100#, 1,000 # cull cows @ $37/100#, and 1,600 # cull bulls @ $47/100#. This produces an average sale price of $296 per animal. This figure, of course, applies to only one point in time and no assumptions can be made about future values.

Two research studies were conducted in northern California that provide the total income and employment impacts of reduced livestock sales. The first is a study by George Goldman, economist with the Department of Agricultural and Resource Economics at the University of California, Berkeley. The other study was by Brian Roach and John Loomis of the Division of Environmental Studies at the University of California, Davis. Both studies analyzed the economic impact of livestock sales on the total regional/local income and employment. The total income multiplier of 1.40 used in this analysis is an average of the research by Roach and Loomis who proposed an income multiplier of 1.47 and George Goldman who proposed a multiplier of 1.3393. The employment multiplier of 13.28 jobs per one million dollars in sales is used because it is the most recent estimate.